

ZOOLOGY.—*A new harpacticoid copepod from Bornean crabs.*<sup>1</sup> ARTHUR G. HUMES, University of Connecticut. (Communicated by WALDO L. SCHMITT.)

A new copepod species from the gill chambers of various marsh crabs was collected at Tarakan, Borneo. The copepods were stained lightly with acid fuchsin, cleared in cedarwood oil, and mounted in clarite, either whole or in segmental dissections to show the appendages. The mouth parts and body segments with their appendages were separated using sharply pointed minuten nadeln.

Identifications of the Bornean crabs were made by Dr. Fenner A. Chace, Jr., of the U. S. National Museum. Paratypes and other specimens of the Japanese species were lent for study by the same museum. Service with the U. S. Navy in Borneo afforded opportunity for the collection of the new material.

#### Family CANTHOCAMPTIDAE

##### *Pholetiscus*, n. gen.

*Generic characters.*—General body shape resembling that of *Cancrincola* Wilson. Female abdomen 3-segmented; male abdomen 4-segmented. Caudal rami moderately short, both bearing terminally a seta two-thirds as long as the body and a shorter seta about one-fourth the length of the other. No anal operculum. Anterior antennae of female with six or eight podomeres; those of the male highly modified for clasping with three to eight podomeres difficult to distinguish. Posterior antennae short, with two or three podomeres, the exopodite minute or apparently absent. Mouth parts in general plan similar to those of *Cancrincola*, but differing in details. Swimming legs all biramous, first pair modified for clasping; in female exopodites 1-4 with three podomeres, endopodites 1-4 with two podomeres; in male rami are similar except for the third endopodite which has three podomeres. Fifth legs in female lamellar, with two podomeres, the basal one indistinctly separated from the body segment and expanded on the inner side; the distal podomere bearing two setae. Fifth leg in male reduced to a low ridge bearing three or four setae. A single ovisac.

*Genotype.*—*Pholetiscus wilsoni* (Pearse) = *Cancrincola wilsoni* Pearse, 1930.

<sup>1</sup> Received February 3, 1947.

*Remarks.*—This new genus may be easily separated from the genus *Cancrincola* on the basis of the several distinctions mentioned below. It includes the new species, *Pholetiscus orientalis*, herein described, and the species originally described by Pearse (1930) as *Cancrincola wilsoni*.

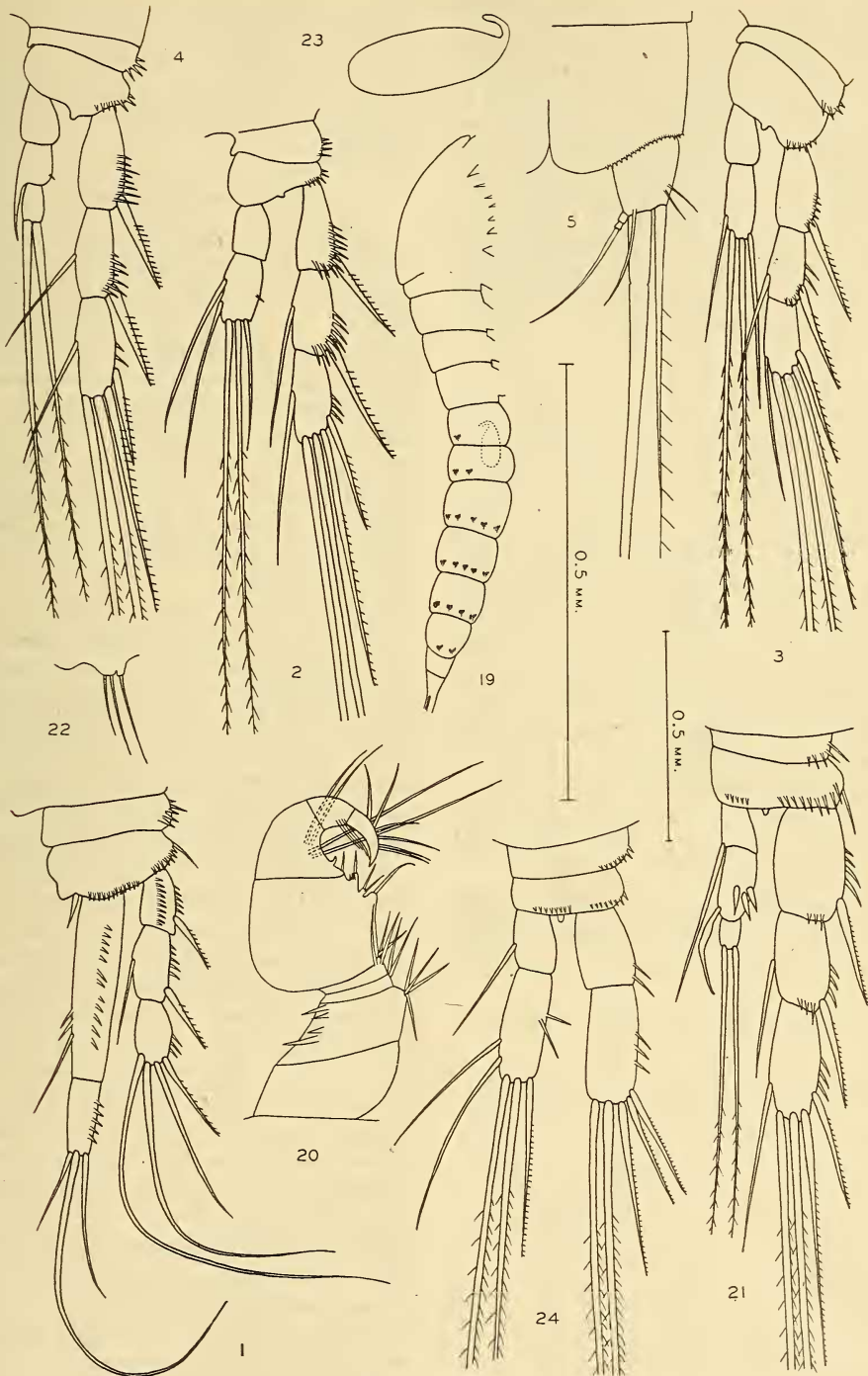
##### *Pholetiscus wilsoni* (Pearse, 1930)

This species was first described from the gill chambers of two marsh crabs, *Sesarma haematocheir* (de Haan) and *Sesarma pictum* (de Haan), at Aburatsubo, Japan. An examination of Pearse's specimens, U.S.N.M. no. 62836, from *S. pictum*, apparently parotypic though not so labeled, shows several features not mentioned in the original description. The sixth thoracic segment (genital) has a weak transverse division dorsally, not seen on the ventral side. The female abdomen is 3-segmented, while that of the male is 4-segmented.

The anterior antennae of the male have more than three podomeres. The joints are difficult to interpret but the podomeres are similar to those of *P. orientalis* to be described below. Podomeres 3 and 4 are very poorly delimited, and are indicated only by slight differences in the thickness of the chitin to be seen in optical section. Podomere 5 is swollen at the outer proximal angle. Fifth and sixth podomeres bear rough protuberances on their inner margins. Seventh and eighth podomeres are indistinctly separated and curved back toward the fifth to form a prehensile organ. The anterior antennae of the female have six podomeres, the sixth perhaps representing the fusion of two or more podomeres. The relative lengths of the podomeres beginning basally are 9:8:5:5:3:7.

Whether the low protuberance at the base of each posterior antenna should be regarded as a distinct podomere is a matter for interpretation. Including this protuberance, the posterior antennae apparently have three podomeres.

The first four pairs of legs resemble in general those of *P. orientalis* described below. Since various setae were omitted in the original description, certain legs will be redescribed here. In the first leg of the female (Fig. 1) the proximal podomere of the endopodite bears a long, slender seta and two minute ones on the distal



FIGS. 1-5.—*Pholetiscus wilsoni* (Pearse): 1, First leg (female); 2, third leg (female); 3, fourth leg (female); 4, third leg (male); 5, caudal ramus (male).

FIGS. 19-24.—*Pholetiscus orientalis*, n. sp.: 19, Body segments (male); 20, anterior antenna (male); 21, third leg (male); 22, fifth leg (male); 23, spermatophore; 24, asymmetrical third leg (female).

All figures drawn with the aid of a camera lucida. The shorter of the two scales applies to Figs. 1-5; the longer only to Figs. 6 and 19.

third of the inner margin. The second podomere of the exopodite bears a seta on the inner side. The second pair of legs was completely figured in the original description. The third pair of legs (Fig. 2) resembles that of *P. orientalis* below except for the absence of a seta on the inner distal angle of the proximal podomere of the endopodite. The fourth pair of legs (Fig. 3) differs from *P. orientalis* below in the absence of setae on the proximal podomere of the endopodite and presence of a long seta on the inner distal region of the second podomere of the exopodite.

In the male the first and second legs are like those of the female. The third pair of legs (Fig. 4) has an endopodite of three podomeres instead of two as given in the original description. The first endopodite podomere is without setae; the second bears a prominent, deeply staining, falciform projection at the inner distal angle and a single small seta on the outer margin; the third is slightly smaller than the preceding two and bears terminally two sparsely plumose setae about 3 times as long as the endopodite itself. The exopodite resembles that of *P. orientalis* to be described. The fourth pair of legs is like that of the female.

In both sexes between the bases of the two rami on the second, third, and fourth legs there is a small projection which stains brilliantly with acid fuchsin.

The arrangement of setae and spines (excluding the groups of variable small setae) on the first four pairs of legs is expressed numerically in Table 1.

The caudal rami (Fig. 5), alike in both sexes,

TABLE 1.—ARRANGEMENT OF SPINES AND SETAE ON SWIMMING LEGS 1-4 OF PHOLETISCUS WILSONI (PEARSE)

Swimming leg	Female			Male			
First pair {	exopodite . . . . .	1,0	1,1	4	1,0	1,1	4
	endopodite . . . . .	0,1	3		0,1	3	
Second pair {	exopodite . . . . .	1,0	1,1	5	1,0	1,1	5
	endopodite . . . . .	0,0	3		0,0	3	
Third pair {	exopodite . . . . .	1,0	1,1	5	1,0	1,1	5
	endopodite . . . . .	0,0	5		0,0	0,1	2
Fourth pair {	exopodite . . . . .	1,0	1,1	5	1,0	1,1	5
	endopodite . . . . .	0,0	4		0,0	4	

Numbers to the left of the comma refer to the number of large spines or setae on the outer edge, those to the right to the number on the inner edge. Single numbers refer to terminal armature. Minute spines or setae are not considered because of their relatively wide variation in number. Scheme adapted from that of Kiefer (1928).

resemble those of the Bornean species to be described, but differ in the two long terminal setae having separate bases. The shorter of the two terminal setae is about one-fourth the length of the longer (which in one female measured 350 $\mu$ ).

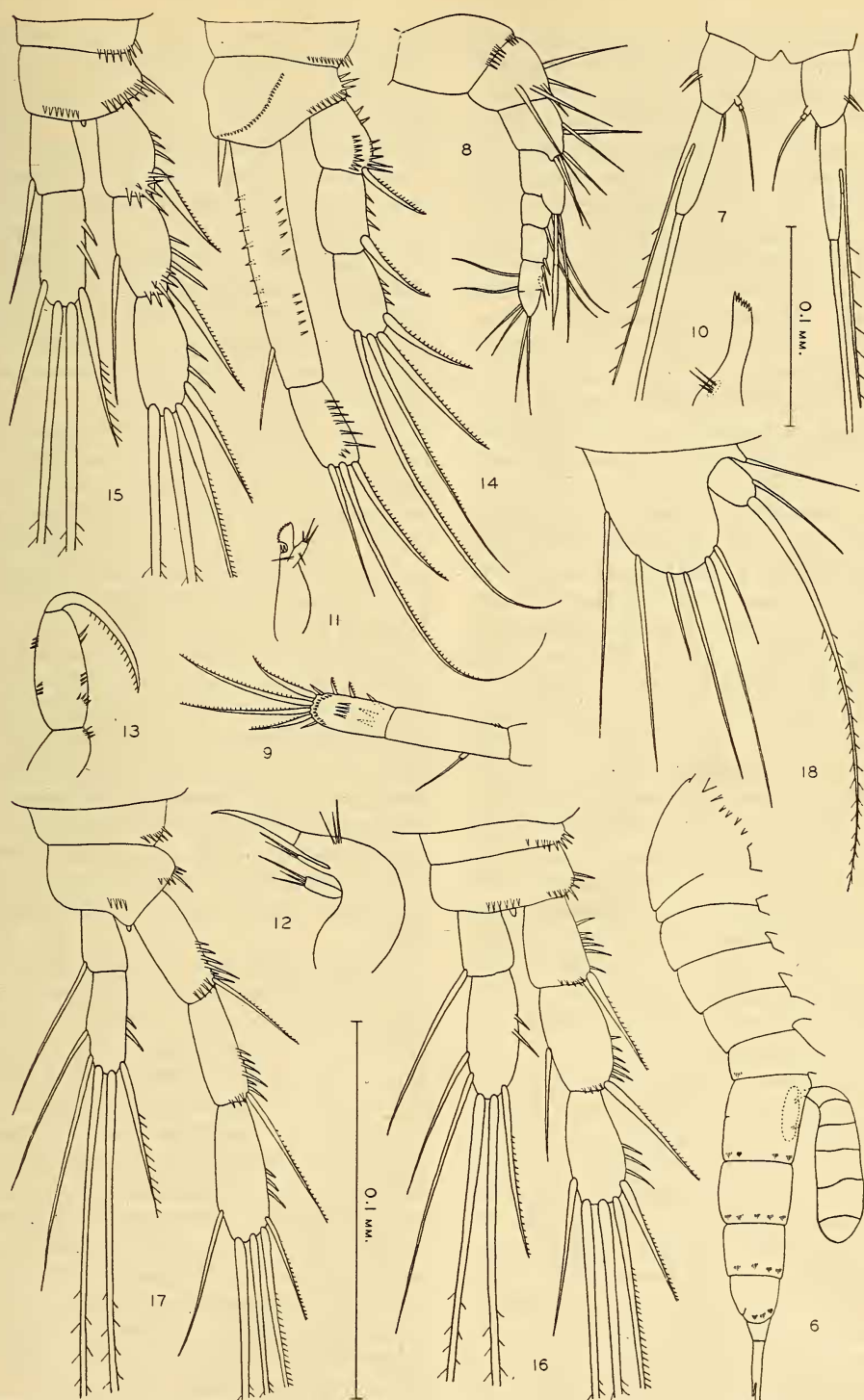
*Pholetiscus orientalis*, n. sp.

Type material, consisting of more than 70 individuals representing both sexes, from the gill chambers of three species of brachyurans, *Sesarma eumolpe* de Man, *Sesarma taeniolum* White, and *Sesarma palawanense* Rathbun (the specific determination of the last-named being somewhat uncertain), collected on August 6, 1945, at Tarakan, Dutch Borneo. Holotype, female, U.S.N.M. no. 82266; allotype, U.S.N.M. no. 82268; 30 paratypes including both sexes, U.S.N.M. nos. 82267 and 82269-82293; the remaining paratypes in the author's collection.

*Female*.—Body moderately slender. Length about seven times the greatest width. Metasome slightly shorter than urosome, both somewhat cylindrical but tapering posteriorly. Cephalic and first thoracic segments approximately equal to the length of the second, third, and fourth thoracic segments combined, well developed laterally, without setae. Rostrum minute, rounded anteriorly and unarmed.

First segment of the 6-segmented thorax usually only indistinctly separated from the head, the dorsum being shorter than that of any of the succeeding thoracic segments. Second, third, and fourth thoracic segments similar to each other in size and shape. Fifth segment with dorsum somewhat shorter than that of the fourth, not telescoped with adjacent dorsa (Fig. 6). Sixth segment of the thorax (genital), bearing a single ovisac at the mid-ventral anterior margin, longer than any of the first five segments and having dorsally a weak transverse division. First four thoracic segments without setae; segment 5 with a vertical row of 6 minute setae (forming a ctenidium) near the posterior lateral margin; segment 6 with a vertical row of four ctenidia each composed of five or six setae on both sides.

Abdomen 3-segmented, third segment slightly shorter than the second and first but all shorter than the sixth thoracic. First abdominal segment with five ctenidia on both sides; second segment with four ctenidia, lack-



Figs. 6-18.—*Pholetiscus orientalis*, n. sp., female: 6, Body segments; 7, caudal rami; 8, anterior antenna; 9, posterior antenna; 10, mandible; 11, first maxilla; 12, second maxilla; 13, maxilliped; 14, first leg; 15, second leg; 16, third leg; 17, fourth leg; 18, fifth leg.

All figures drawn with the aid of a camera lucida. The shorter of the two scales applies only to Fig. 7; the longer to Figs. 8-18 and 20-24.

ing the dorsal one; third segment with three ctenidia, lacking both dorsal and dorsolateral groups, and deeply incised in the anal region.

Caudal rami (Fig. 7) shorter than the anal segment, armed on the outer side with two small equal setae and on the inner distal region with two setae, the proximal one of which being four times the length of the distal one and set upon a 2-jointed pedicel. On the posterior end of both caudal rami an elongated portion nearly twice the length of the caudal ramus; bearing at a point slightly less than halfway to the distal end on the outer margin a long seta, four times the length of the caudal ramus and having seven equidistant hairlike projections along its outer edge beginning at a point nearly one-half the distance from its base; bearing terminally a much longer, slightly curved seta about two-thirds of the body length and finely plumose along the distal two-thirds.

Anterior antennae (Fig. 8) with eight podomeres, the joint between 7 and 8 weakly chitinized or indicated only by a thin area in the chitin. With numerous setae ventrally on podomeres 2-8. On the first podomere a distal, ventrolateral row of about eight setae; distal ventral area of podomere 3 slightly projected and bearing three setae; the same area of podomere 4 strongly projected, bearing two unequal setae, the ventral one long and slender, the dorsal one of nearly equal length but swollen along the distal third and in stained specimens showing a lightly chitinized ring at its mid-region; seventh podomere with two dorsal setae; eighth indistinctly separated from the seventh and bearing two setae dorsally and two longer ones terminally.

Posterior antennae (Fig. 9) shorter than the anterior pair, with apparently three podomeres and a monomeric exopodite. Basal podomere very short and wide, consisting of a low protuberance upon which the antenna is set. Second podomere cylindrical, bearing near the center of the outer margin an exopodite consisting of a minute cylindrical piece with a single terminal seta, and having basally on the inner margin three minute setae. Distal podomere with a row of three strong setae near the base, a row of four weaker setae on the surface of the distal half, and an arched row of 12 smaller setae along the distal margin; terminally a row of four strongly developed, pectinate setae and laterally at both ends of the row

a short seta; on the inner side of the distal podomere two short, stout, pectinate setae.

Mandibles (Fig. 10) minute, slender, about  $30\mu$  in length, with a group of seven teeth distally and on the outer side near the base three setae arising from an indistinct oval area, perhaps representing an exopodite.

First maxillae (Fig. 11) approximately the same size as the mandibles, consisting of an elongated basal portion having a terminal, flabelliform projection finely dentate distally and two small adjacent setae, and bearing laterally an outer cylindrical piece with three terminal and two lateral setae.

Second maxillae (Fig. 12) slightly larger than the preceding pair, consisting of an elongated recurved basal part provided terminally with a long, slightly curved claw and on the inner side two cylindrical projections bearing two and three setae, respectively, and having a group of three small setae on the outer side near the base of the claw.

Maxillipeds (Fig. 13) with two podomeres and a terminal claw, prehensile (with three podomeres if the claw is regarded as a true podomere); proximal podomere short with three minute setae at the inner distal angle; distal podomere elongated with three groups of setae on the inner edge and two groups on the outer margin, bearing terminally a slender, curved claw nearly as long as the podomere itself and pectinate along its concave distal two-thirds.

First four pairs of swimming legs biramous, the first pair adapted for clasping, the following three for swimming; endopodites with two podomeres, exopodites with three. The fifth pair of legs highly modified. First pair of legs (Fig. 14) with a dimerous basipodite, its anterior surface bearing short spines in rows; the proximal part armed with a transverse row of 10 spines along its outer angle; the distal part with a similarly placed row of 13 spines, an oblique row of about 30 minute spines extending from the midbasal region to the inner angle, and a large stout seta at the inner distal angle. Exopodite of three similar podomeres, unarmed medially, each armed with a stout pectinate seta at the outer distal angle; the first podomere with two rows of five and eight setae respectively distally and two isolated setae proximally along its outer margin; the second and third podomeres with three setae along

the outer margin; terminally on the third podomere a row of three prominent setae, the inner two longer than the exopodite itself and pectinate medially, the outer one half as long, stouter, and pectinate. Endopodite nearly one and one-half times the length of the exopodite, with two podomeres; the proximal podomere three times the length of the distal one, armed on the outer side with two longitudinal rows of five setae and on the inner margin with a central row of eight setae and a single larger seta near the inner distal angle; the distal podomere with a row of six spiniform setae on the outer margin, two smaller setae at the distal end of the row, and terminally three setae, the outer one stout and pectinate, the middle one as long as the endopodite itself, slender and pectinate along its midlength, the inner one slender and much shorter.

Second pair of legs (Fig. 15) with a dimerous basipodite having a row of spines at the outer distal angles of the two parts and a third row near the base of the endopodite; between the bases of the rami a small projection which stains brilliantly with acid fuchsin. Exopodite with three similar podomeres, each armed with a stout pectinate seta on the outer distal angle; the first podomere with a row of three setae on the outer margin and a group of seven spiniform setae on the outer distal angle; the second with similar setae, and in addition a long, slender seta arising from the center of the inner margin; the third with two setae on the outer margin and three long terminal setae, the outer one pectinate, the other two slender, longer than the exopodite itself and feathered, the inner of the two more sparsely so. Endopodite with two similar podomeres, the proximal one slightly shorter; both bearing a long seta at the inner distal angle; the distal podomere with two small setae on the outer margin, a pectinate seta at the distal outer angle, and terminally two long setae which are plumose in the distal half.

Third pair of legs (Fig. 16) similar in most respects to the second. Exopodite with three similar podomeres, the setal arrangement like that of the second exopodite, but with variations in the number of small setae and with the addition of a seta at the inner distal angle of the third podomere. Endopodite with two podomeres, similar to those of the second endopodite but with the addition of a long seta

between the inner terminal seta and the seta at the inner distal angle.

Fourth pair of legs (Fig. 17) resembling the second. Exopodite with three equal podomeres, the setal arrangement similar to that of the third exopodite, but with variations in the number and with the deletion of the inner seta on the second podomere. Endopodite with two podomeres, similar to those of the third endopodite.

The setal arrangement of swimming legs 1-4 is expressed numerically in Table 2.

Fifth legs (Fig. 18) uniramous, lamellar, with two podomeres, the basal one with a single seta on the outer corner and expanded on the inner side into a broad lamina bearing terminally a row of six setae, the outermost and the third from the midline being distinctly shorter than the others which are nearly twice as long as the lamina; distal podomere oval with two unequal setae terminally, the inner one more than three times the length of the lamina and plumose on its distal half.

A single ovisac containing 7-11 eggs, each approximately  $50\mu$  in diameter, in a single layer.

Measurements based upon 10 females are as follows: Total length exclusive of setae, 0.637 mm (0.588-0.705 mm); greatest width (at first thoracic segment), 0.094 mm (0.080-0.110 mm); length of caudal setae, 0.431 mm (0.426-0.514 mm).

Color in living specimens transparent to opaque white.

*Male*.—General body form similar to that of the female, but slightly smaller in size (Fig. 19). Sixth thoracic segment not distinctly longer than adjacent segments. Fifth thoracic segment with a posterior dorsolateral group of minute setae on both sides. Sixth thoracic segment with two linear groups of such setae. Abdomen 4-segmented, the sides of the first and second segments with five linear groups of minute setae, the third with four and the fourth with two such groups. Caudal rami as in the female.

Anterior antenna (Fig. 20) highly modified for clasping, with eight podomeres (the number being difficult to distinguish) with their joints strongly chitinized; first podomere without setae; second with four spiniform setae arising from the outer side, and four slender setae situated on a slight projection on the

inner side; third and fourth podomeres very short with several setae on the inner margins; fifth very large and swollen along the outer proximal angle with several setae on the inner margin, some on conical projections; sixth concave on inner margin from which arise two pairs of long setae and one or more stout knoblike ridges; seventh with inner surface half the length of the outer edge and bearing at the distal angle a group of filamentous setae; eighth podomere terminally pointed and claw-like, with six setae arising from its convex outer edge; the whole arranged so that the tip of the eighth podomere may be brought in contact with the inner distal angle of the fifth.

Second antennae, mouth parts, and first and second legs similar to those of the female. Third pair of legs (Fig. 21) with basipodite and exopodite like those in the female, but endopodite with three podomeres instead of two; the first armed with a long seta at the inner distal angle; the second slightly longer, bearing three short, stout setae near the middle of its outer margin and a falciform projection (its articulation difficult to distinguish) at the inner distal angle; the third podomere distinctly smaller, about half the length of the first, the joint separating it from the second often not strongly chitinized, and bearing terminally two long setae which are sparsely plumose distally.

Fourth pair of legs like that of the female but usually lacking the two inner distal setae, rarely only one, on the second podomere of the endopodite.

The setal arrangement of swimming legs 1-4 is shown in Table 2.

TABLE 2.—ARRANGEMENT OF SPINES AND SETAE ON SWIMMING LEGS 1-4 OF *PHOLETISCUS ORIENTALIS*, N. SP.

Swimming leg	Female			Male			
First pair	exopodite . . . . .	1,0	1,0	4	1,0	1,0	4
	endopodite . . . . .	0,1	3		0,1	3	
Second pair	exopodite . . . . .	1,0	1,1	4	1,0	1,1	4
	endopodite . . . . .	0,1	4		0,1	4	
Third pair	exopodite . . . . .	1,0	1,1	5	1,0	1,1	5
	endopodite . . . . .	0,1	5		0,1	3,1	2
Fourth pair	exopodite . . . . .	1,0	1,0	5	1,0	1,0	5
	endopodite . . . . .	0,1	5		0,1	3	

See Table 1 for explanation of numbers.

Fifth legs of the male (Fig. 22) very much smaller than in the female, reduced to a low lamellar ridge with three setae, the outermost the longest and set upon a cylindrical base, the

innermost the shortest. The two internal setae are borne upon a low projection separated by a groove from the base of the external seta. Medially to the three setae a slightly projecting area which usually is nude, but which in two specimens bore a single seta.

Spermatophore (Fig. 23) elongate, oval, attenuated, and recurved at the anterior end.

Measurements of 10 males: Total length exclusive of setae, 0.592 mm (0.514-0.646 mm); greatest width (first thoracic segment), 0.092 mm (0.088-0.102 mm); length of caudal setae, 0.444 mm (0.411-0.480 mm).

Color in living specimens like that of the female.

Remarks.—*Pholetiscus orientalis* differs from the only other known species of the genus, *P. wilsoni* (Pearse), in the following respects:

FEMALE:

Anterior antennae with eight podomeres instead of six.

Presence of an exopodite on posterior antennae.

Differences in setal arrangement on swimming legs 1-4 (compare the numerical tabulations in Tables 1 and 2).

Two long terminal setae on caudal rami arise from common base instead of separately (compare Figs. 5 and 7).

MALE:

Differences in armature of the endopodite of the third swimming leg (compare Figs. 4 and 21).

One female copepod was found in which all rami of the swimming legs were normal except the exopodite of the left third leg (Fig. 24) which had only two podomeres instead of three, with the setal arrangement 0, 0, and 5.

The number of small setae in groups on the thoracic legs is subject to variation, and for that reason it is doubted whether giving formulas of all setae, large and small, is particularly useful. Such variation exists, for example, in the number of setae along the inner margin of the first thoracic endopodite, which was found to vary from six to nine with the usual number of eight.

When the copepods were placed in a watch glass of sea water, they swam about actively, often in pairs, a male clasping the terminal setae of the caudal rami of a female by means of its anterior antennae.

The food of *P. orientalis* consists partly at

TABLE 3.—INCIDENCE OF *PHOLETISCUS ORIENTALIS* IN HOST CRABS AT TARAKAN, DUTCH BORNEO

Host crab	Number of specimens examined	Number positive	Number negative	Largest number found in any individual crab	Average number of copepods per positive crab
<i>Sesarma eumolpe</i> de Man:					
Females.....	24	20	4	27	5.4
Males.....	24	15	9	34	6.7
Total.....	48	35	13		6.0
<i>Sesarma taeniolum</i> White:*					
Females.....	11	5	6	7	5.0
Males.....	13	5	8	7	3.4
Total.....	24	10	14		4.2
Grand total.....	72	45	27		5.0

\* Included in this category are a few individuals of *Sesarma palawanense* Rathbun, not distinguished from *taeniolum* at the time of collection.

least of diatoms of the *Pinnularia* type and blue-green algae, both of which were frequently observed in the alimentary tract of mounted specimens.

The incidence of *P. orientalis* in host crabs at Tarakan is shown in Table 3.

The crabs were collected in a marshy area a quarter of a mile west of the town of Tarakan, located on Tarakan Island in the delta region formed by the Sungei Sesayap. The marsh is periodically flooded by tidal water from Batagau Strait. Some crabs were found in water-filled depressions, others were running about on moist ground under debris of wooden shingles and rotting palm fronds.

In all three species of host crabs and in both sexes unidentified nematodes and dipriferous lar-

vae were frequently found in the gill chambers along with the copepods.

DISCUSSION

The genus *Pholetiscus* mihi is related to *Cancrincola* Wilson, 1913, and both may be included in the family Canthocamptidae *sensu lato*. However, if the family is used in the restricted sense, as in Monard's synoptic work on the harpacticoids (1927), then it properly would include only *Pholetiscus*, *Cancrincola* being removed to the Ameiridae.

The two genera are well defined, both morphologically and geographically, *Cancrincola* being found in the Caribbean and Gulf of Mexico area, and *Pholetiscus* in Borneo and Japan. It seems probable that future investiga-

TABLE 4.—DISTINCTIVE CHARACTERS SEPARATING THE GENERA *CANCRINCOLA* AND *PHOLETISCUS*

Character		<i>Cancrincola</i>	<i>Pholetiscus</i>
Females	Rami of legs 1-4.....	Endopodite of first with 2 podomeres; all others with 3.	Endopodites with 2 podomeres; exopodites with 3.
	Number of abdominal segments.....	4	3
	Number of aesthetascs.....	1 or 2	None
	Distal podomere of fifth leg.....	With 4 or 5 terminal setae.	With 2 terminal setae.
	Terminal setae on caudal ramus*.....	1 long curved seta plus other small ones.	1 long curved seta, another $\frac{1}{4}$ - $\frac{1}{2}$ as long, plus other small ones.
Mandibular palp*.....	Cylindrical, tipped with about 4 slender setae.	Reduced to only 1-3 small setae.	
Males	Number of abdominal segments.....	4	4
	Anterior antennae.....	With 8 podomeres, moderately prehensile.	With 3-8 podomeres, strongly prehensile.
	Number of aesthetascs.....	1	None
	Rami of legs 1-4.....	Endopodite of first with 2 podomeres; all others with 3.	Endopodites of first, second, and fourth with 2 podomeres; endopodite of third with 3 podomeres; all exopodites with 3.

\* True of male also.



tions will greatly increase the geographical range of these genera. Both genera occur in the gill chambers of marsh crabs, especially those of the genus *Sesarma*, commonly found in the vicinity of river deltas.

The two genera are readily separated by making the comparisons shown in Table 4.

The harpacticoid copepods at present known to inhabit the gill chambers of crabs comprise four species belonging to two distinct though related genera, namely, *Cancrincola jamaicensis* Wilson, 1913, *C. plumipes* Humes, 1941, *Pholetiscus wilsoni* (Pearse, 1930), and *P. orientalis* mihi. The two species of *Pholetiscus* may be distinguished from those of *Cancrincola* and from each other by the following key:

1. Female.....2  
Male.....4
2. Endopodite of first leg with 2 podomeres, all others with 3; distal podomere of fifth leg with 4 or 5 terminal setae.....*Cancrincola*  
Endopodites all with 2 podomeres; distal podomere of fifth leg with 2 terminal setae.....*Pholetiscus*...3
3. With exopodite on posterior antennae; 2 long terminal setae on caudal ramus arising from common base.....*P. orientalis*  
Without exopodite on posterior antennae; 2

- long terminal setae on caudal ramus arising separately.....*P. wilsoni*
4. Endopodites of second, third, and fourth legs with 3 podomeres.....*Cancrincola*  
Endopodites of second and fourth legs with 2 podomeres, third with 3...*Pholetiscus*...5
5. Three stout spines near base of falciform projection on second podomere of third endopodite.....*P. orientalis*  
One minute spine near base of falciform projection on second podomere of third endopodite.....*P. wilsoni*

LITERATURE CITED

HUMES, ARTHUR GROVER. *A new harpacticoid copepod from the gill chambers of a marsh crab*. Proc. U. S. Nat. Mus. 90: 379-386. 1941.

KIEFER, FRIEDRICH. *Über Morphologie und Systematik der Süßwassercyclopiden*. Zool. Jahrb., Abt. Syst., 54: 495-556. 1928.

MONARD, ALBERT. *Synopsis universalis generum Harpacticoidarum*. Zool. Jahrb., Abt. Syst. 54: 139-176. 1927.

PEARSE, ARTHUR SPERRY. *Parasites of Japanese Crustacea*. Annot. Zool. Japon. 13: 1-8. 1930.

WILSON, CHARLES BRANCH. *Crustacean parasites of West Indian fishes and land crabs, with descriptions of new genera and species*. Proc. U. S. Nat. Mus. 44: 189-277. 1913.

PROCEEDINGS OF THE ACADEMY

408TH MEETING OF BOARD OF MANAGERS

The 408th meeting of the Board of Managers, held in the Cosmos Club, April 14, 1947, was called to order at 8 P.M. by the President, Dr. WALDO L. SCHMITT. Others present were: H. S. RAPPLEYE, F. M. SETZLER, W. N. FENTON, H. B. COLLINS, JR., W. W. DIEHL, J. S. WADE, L. E. YOCUM, W. A. DAYTON, M. A. MASON, A. O. FOSTER, C. L. GARNER, C. L. GAZIN, and, by invitation, G. P. WALTON.

The President announced the appointment of A. T. MCPHERSON and W. W. RUBEY to the Legislative Committee, authorized at the March 17 meeting of the Board, with Dr. MCPHERSON as Chairman. Additional appointments to this Committee are expected to be made in the near future.

The Chairman of the Meetings Committee, G. P. WALTON, announced that Prof. J. B. SUMNER, biochemist of Cornell University, had been scheduled to speak at the May meeting of the ACADEMY on the work for which he was recently awarded a Nobel Prize.

Ten persons were elected to membership in the ACADEMY.

The Chairman of the Anniversary Committee, F. M. SETZLER, reported an informal consideration of plans for celebrating the 50th anniversary of the founding of the ACADEMY. The date for such a celebration was discussed, and informal show of hands indicated a majority of the Board in favor of February 18, 1948. The desirability of holding a subscription dinner was discussed as one of the ways in which the anniversary might be observed.

The Treasurer, Mr. RAPPLEYE, announced an increase in returns from investments in the Washington Sanitary Improvement Co. He also announced that 30 new subscriptions for the JOURNAL had been obtained from Russian sources, with a possibility of 5 more.

The Senior Editor, Dr. FENTON, reported the prospect of devoting one issue of the JOURNAL to the three Academy Award winners for 1947.

The President presented his ideas on the desirability of appointing a historian for the ACADEMY, or a committee, to look into various past activities and in particular to ferret out any unconsummated actions indicated in the Board's past records.